PATENT SPECIFICATION

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646,190

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PROVISIONAL SPECIFICATION

Improvements in or relating to Endless Belt Conveyors

We, FISHER & LUDLOW LIMITED, a British Company, of Albion Works, Kingsbury Road, Erdington, Birmingham, 24, in the County of Warwick, do hereby declare the nature of this invention to be as follows:—

This invention relates to endless belt conveyors of the kind in which the belt is supported by a belt housing extending longitudinally of the conveyor, the belt housing being built up from a plurality of connected sections for example as described in our prior patent specification No. 586,343 or as described in our Provisional Specification No. 26702/47 (Serial No. 638,681).

In connecting two sections together more particularly where these are of substantial length it frequently happens that owing to imperfections in manufacture or in assembly of the parts that the ends of the two sections are nearer to one another at one side of the convevor than at the other side thereof when the two sections are in the correct relationship for properly supporting the belt. Furthermore due to imperfections in the manufacture of the belt, or as a result of unequal loading thereof during use, or to imperfections in the manufacture or assembly of the parts of the belt housing, the load carrying run of the belt may be improperly supported at the junction between the two sections when these are connected together.

The present invention has for its object the provision of a device for connecting together a pair of belt housing sections in such a manner that allowance can be made for the imperfections referred to and the sections connected together in the desired relative position for properly supporting the belt, and the latter properly supported at the junction between the two sections.

According to the present invention we provide a connecting device for connecting together two belt housing sections, said device comprising a pulley or roller for supporting the load carrying run of the belt, two pairs of bearing members disposed one pair at each end of the pulley or roller and supporting the same rotatably therefrom, means for connecting one bearing member of each pair to one housing section and the other to the other housing section at each side of the conveyor, and means for adjusting each bearing member in relation to its associated section in a direction longitudinally thereof so that the distance between the ends of adjacent sections can be varied at each side of the conveyor and the position of the pulley or roller in relation to either or both of the sections can be adjusted so as to vary the position of the pulley or roller in relation to the load carrying run of the conveyor belt.

Preferably each bearing member is adapted for detachable connection to its associated belt housing section. For instance each bearing member may be mounted adjustably upon a supporting plate or bracket, the latter being itself adapted each for connection to one side of the corresponding belt housing section.

The device may include means for adjusting the relative inclination of the adjacent belt housing sections, preferably about the axis of rotation of the pulley or roller and each of the supporting plates referred to may be mounted for relative pivotal movement in relation to the pulley or roller, and about the axis of rotation thereof. One of the plates may be formed with a quadrant slot centred on the axis of rotation aforesaid and the other plate may have associated therewith a projection which extends

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through the slot so as to limit the relative adjustment.

In one construction as applied to an endless belt conveyor of the general form described in our Provisional Specification No. 26702/47 (Serial No. 638,681) such endless belt conveyor may comprise a belt housing made up from a plurality of sheet metal sections of the form described in our aforesaid Provisional Specification, and adjacent sections may be connected together by a connecting device comprising two pairs of supporting plates disposed one pair at each side of the conveyor, the plates being disposed with their planes vertical with the two plates of each pair in partially overlapping relationship and having their non-overlapping oppositely directed extremities secured detachably by bolts to opposite sides of the adjacent ends of the two belt housing sections to be connected.

One plate of each pair is flat and the other cranked adjacent the overlapping part thereof so that the overlapping portion in each pair abut along their adjacent faces, while the extremities of the two plates of each pair are in the same plane.

Near their upper ends the overlapping portions of each pair of plates are formed with a slot extending substantially longitudinally of the conveyor, the upper and lower edges of the slot being straight and parallel and terminating at opposite ends of the slot in semi-circular edges, and through the two slots at each side of the conveyor extend bearing bosses, the opposed inner ends of which are hollow and provide bearings for supporting rotatably opposite ends of a spindle carrying a roller for suporting the upper run of the conveyor belt, which in this particular embodiment is the load carrying run. In such an arrangement the diameter of the roller is somewhat less than the distance between the adjacent ends of the two belt housing sections.

The outer ends of each plate between the over-lapping portions thereof and the associated belt housing sections carry laterally directed lugs, the extremities of which are formed with holes extending longitudinally of their associated belt housing sections, through each of which holes extend a screwed stud in a direction radially with respect to the axis of rotation of the roller, each stud being secured at one end to a collar so that two collars are provided at each side of the conveyor, one associated with one supporting plate at each side and the other associated with the other supporting plate and each of these collars form bearing members and receive the adjacent bearing boss at each end of the roller.

The other end of each of the screwed studs carries an adjusting nut whereby the position of the bearing members may be adjusted in a direction longitudinally of the conveyor relative to their associated supporting plate, i.e. relative to the associated side of the belt housing section.

The bearing boss may be non-rotatable with respect to the outer collar by providing the latter with a radial pin engaging in a radial hole in the bearing boss so that the latter in effect forms part of the bearing member for supporting the roller for rotation, while the inner collar in each case is free to pivot about the exterior of the corresponding bearing boss, whereby the angular position of the two belt housing sections can be adjusted about the axis of rotation of the roller.

The outer of each of the supporting plates are formed in the lower part of their superposed portions with a quadrant slot centred on the axis of rotation of the roller, and between the opposed faces of the lower parts of the inner of the two superposed portions of each supporting plate, is rotatably mounted an idler roller for supporting the return run of the belt, the spindle of which idler roller projects at opposite ends through the quadrant slot referred to so that by suitably selecting the length of this the relative angular adjustment of the two belt housing sections can be limited to the degree desired.

In using the device as above described for connecting together in the desired relationship two adjacent belt housing sections after the parts have been assembled in the manner described, the adjacent ends of the two belt housing sections can be brought nearer to one another or displaced further away from one another at each side of the conveyor by suitably turning the two adjusting nuts at one side thereof.

Alternatively where it is desired to adjust the roller itself in a direction substantially longitudinally of the conveyor for the purpose of adjusting the manner in which the load carrying run of the belt is supported, the two nuts at one or both sides of the conveyor would both be turned in such a manner as to displace the one, or if desired both ends of the roller in either of two opposite directions in relation to the slot in the overlapping two belt housing sections without varying the distance between the sections.

Thus the present invention provides a device whereby the difficulties above referred to in connecting together two belt housing sections and in properly support-

ing the load carrying run of the belt can be avoided.

Dated the 11th day of August, 1948.
FORRESTER, KETLEY & CO.,
Chartered Patent Agents,
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Birmingham, 2, and
Jessel Chambers, 88/90, Chancery Lane,
London, W.C.2.

COMPLETE SPECIFICATION

Improvements in or relating to Endless Belt Conveyors

We, FISHER & LUDLOW LIMITED, a British Company, of Albion Works, Kingsbury Road, Erdington, Birmingham, 24, in the County of Warwick, do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to endless belt conveyors of the kind in which the belt is supported by a belt housing extending longitudinally of the conveyor, the belt housing being built-up from a plurality of connected conveyor sections, for example as described in our prior patent Specification No. 586,343, or as described in our Specification No. 26702/47 (Serial No. 638,681).

In connecting two sections together, more particularly where these are of substantial length, it frequently happens that owing to imperfections in manufacture or in assembly of the parts that the ends of the two sections are nearer to one another at one side of the conveyor than at the other side thereof when the two sections are in the correct relationship for properly supporting the belt. Furthermore, due to imperfections in the manufacture of the belt, or as a result of unequal loading thereof during use or to imperfections in the manufacture or assembly of the parts of the belt housing, the load-carrying run of the belt may be improperly supported at the junction between the two sections when these are connected together.

The present invention has for its object the provision of a device for connecting together a pair of conveyor sections in such a manner that allowance can be made for the imperfections referred to, and the sections connected together in the desired relative position for properly supporting the belt and enabling the latter to be properly supported at the junction between the two sections.

According to the present invention we provide a connecting device for connecting together two belt conveyor sections, said device comprising a pulley or roller for supporting the load-carrying run of the belt, two pairs of bearing members disposed one pair at each end of the pulley or roller and supporting the same rotatably therefrom, means for connecting one bearing member of each pair to one section and the other to the other section at each side of the conveyor, and means for adjusting each bearing member in relation to its associated section in a direction longitudinally thereof so that the distance between the ends of adjacent sections can be varied at each side of the conveyor, and the position of the pulley or roller in relation to either or both of the sections can be adjusted so as to vary the position of the pulley or roller in relation to the load-carrying run of the conveyor belt in a direction longitudinally of the conveyor.

Preferably each bearing member is adapted for detachable connection to its associated conveyor section. For instance each bearing member may be mounted adjustably upon a supporting plate or bracket, the latter being itself adapted each for connection to one side of the corresponding conveyor section.

The device may include means for adjusting the relative inclination of the adjacent conveyor sections, preferably about the axis of rotation of the pulley or roller, and each of the supporting plates referred to may be mounted for relative pivotal movement in relation to the pulley or roller, and about the axis of rotation thereof. One of the plates may be formed with a quadrant slot centred on the axis of rotation aforesaid and the other plate may have associated therewith a projection which extends through the slot so as to limit the relative adjustment.

The invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a side elevation of part of an endless belt conveyor embodying a connecting device in accordance with the present invention: and

Figure 2 is a plan view of part of the construction depicted in Figure 1.

In the drawings the invention is

depicted as applied to the connecting together of two conveyor belt sections of an endless belt conveyor as described in our Specification No. 26702/47 (Serial No. 638,681) of which one complete section aforesaid is depicted in Figure 1 of such specification; the end of the section to be connected being depicted at the lefthand end of Figure S of such specification.

As described in such specification, each conveyor section aforesaid is of such form, except at its extremities, to support the upper run of the conveyor belt so that this is of trough form in cross section.

The end portions of two such sections to be connected are depicted at 10 and 11 in the drawings, wherein the upper run of the endless conveyor belt is indicated at 12 and the lower run thereof at 13.

The connecting device forming the subject of the present invention comprises two pairs of plate-like brackets 14, 15, disposed one pair at each side of the conveyor, the bracket plates being disposed with their planes vertical with the two plates of each pair in partially overlapping relationship, and having their non-overlapping oppositely-directed extremities secured detachably by screws 16 to opposite sides of the adjacent ends of the two conveyor sections to be connected.

Each of the bracket plates 15 is conveniently flat, the remaining plate 14 of each pair being cranked at 17 so that the overlapping portions of the plates abut along their opposed faces, while the extremities of the two plates of each pair are in the same vertical plane.

Near their upper ends the overlapping portions of each pair of plates are formed with a slot 18 extending substantially longitudinally of the conveyor, the two slots being disposed substantially in register with one another with their upper and lower edges straight and parallel, and terminating at opposite ends of the slot in semi-circular edges 19.

Through the two slots at each side of the conveyor extend bearing bosses, at 20, of cylindrical form the opposed inner ends of which are recessed to provide bearings for supporting rotatably opposite ends of a spindle 21 carrying a roller 22 for supporting the upper run of the conveyor belt 12 where this passes from one conveyor section to the other, the diameter of the roller 22 being somewhat less than the distance between the adjacent ends of the sections 10, 11.

The outer faces of each plate 14, 15 carry outwardly-directed lugs 23 the extremities of which are formed with holes extending longitudinally of the associated conveyor sections, through each of which holes extends a screwed stud 24 disposed radially with respect to the axis of rotation of the roller, each stud being secured at one end to a collar 25 so that two such collars are provided at each side of the roller 22, in each of which pair of collars are housed the adjacent bearing boss 20.

The outer ends of the studs 24 each carry an adjusting nut 26 whereby the position of the collars, and hence of the bearing bosses and roller, can be adjusted in a direction longitudinally of the conveyor relative to the associated bracket plate, i.e. relative to the associated side of the conveyor section.

Each bearing boss 20 is secured against rotation with respect to each of the outer collars 25 by means of a radial set screw 27, the inner collar which is associated with the cranked bracket 14 being free to pivot about the exterior of the corresponding bearing boss so that the angular position of the two conveyor sections can be adjusted relatively about the axis of the roller 22.

The outer of each of the bracket plates, namely each of the plates 15, is formed in the lower part of the superposed portions with a quadrant slot 28 centred on the axis of rotation of the roller, and between the lower parts of the inner of the two superposed portions is rotatably mounted an idler roller 29, the spindle 30 of which idler roller is supported rotatably in each of the inner plates 14 and projects beyond the same into the adjacent quadrant slot 28, thus serving to limit the relative angular adjustment of the two plates 14, 15 in each pair, and hence of the associated conveyor sections, the extent of such adjustment being predetermined by suitable selection of the length of each slot 28.

In using the device as above described for connecting together in the desired relationship two adjacent conveyor sections, after the parts have been assembled in the manner described, the adjacent ends of the two sections can be brought nearer to one another or displaced further away from one another at each side of the conveyor by suitably turning the two adjusting nuts 26.

Alternatively, where it is desired to adjust the roller itself in a direction substantially longitudinally of the conveyor for the purpose of adjusting the manner in which the load-carrying run of the belt is supported, the two nuts at one or both sides of the conveyor would both be turned in such a manner as to displace the one end, or if desired both ends of

the roller in either of two opposite directions longitudinally in relation to the two conveyor sections without varying the distance between the sections.

Thus, the present invention provides a device whereby the difficulties above referred to in connecting together two conveyor sections, and in properly supporting the load-carrying run of the belt, can be avoided.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A connecting device for connecting together two belt conveyor sections of a belt conveyor of the kind specified, said device comprising a pulley or roller for supporting the load-carrying run of the belt, two pairs of bearing members disposed one pair at each end of the pulley or roller and supporting the same rotatably therefrom, means for connecting one bearng member of each pair to one section and the other to the other section at each side of the conveyor, and means for adjusting each bearing member in relation to its associated section in a direction longitudinally thereof so that the distance between the ends of adjacent sections can be varied at each side of the conveyor and the position of the pulley or roller in relation to either or both of the sections can be adjusted so as to vary the position of the pulley or roller in relation to the load-carrying run of the conveyor belt in a direction longitudinally of the conveyor.

2. A device according to Claim 1, wherein each bearing member is adapted for detachable connection to its associated conveyor section.

3. A device according to Claim 1 or 2, wherein each bearing member is mounted adjustably upon a supporting bracket, the latter being itself connected or adapted each for connection to one side of the corresponding conveyor section.

4. A device according to Claim 3, wherein each bearing member is constructed in the form of a collar, each collar being mounted upon one end of a screw stud, each of which studs extends through a lug provided each on one of the brackets, each stud carrying a nut which engages with the lug so that by adjusting one or both nuts at one or both sides of the conveyor the collars and the pulley or roller supported therefrom may be adjusted longitudinally in relation to one or both conveyor sections and at one or both ends of the pulley or roller.

5. A device according to Claim 3 or 4, further characterised in that the pulley or roller is supported rotatably at each end within a bearing, each bearing extending within two collars at each side of the conveyor, each of the brackets being constructed in the form of plates which overlap with one another at each side of the pulley or roller, the overlapping portions being formed each with a slot disposed or adapted to be disposed in register with one another at each side of the pulley or roller, the bearing extending through the two slots at each side of the pulley or roller and being displaceable along the length of such slots for the purpose of effecting the adjustment referred to.

6. A device according to any of the preceding claims, further characterised by the provision of means for adjusting the relative inclination of the adjacent conveyor sections about the axis of rotation of the pulley or roller.

7. A device according to Claim 5, or according to Claims 5 and 6, wherein each of the plate-like brackets is mounted for relative pivotal movement in relation to the pulley or roller and about the axis of rotation thereof, one of the brackets at each side of the conveyor being formed in its overlapping portion with a quadrant slot centred on the axis of rotation of the pulley or roller, the other plate having associated therewith a projection which extends through the slot so as to limit the relative adjustment.

8. A device according to Claim 7, further characterised in that the projection is formed by opposite ends of a spindle carrying an idler roller for supporting the return run of the endless belt, the ends of the spindle extending through the quadrant slot in one of the two overlapping plates at each side of the conveyor and being supported rotatably by the other of each of said plates.

9. A device for connecting together two conveyor sections of an endless belt conveyor of the kind described, said device being constructed substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

Dated the 26th day of August, 1949.
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[This Drawing is a reproduction of the Original on a reduced scale.]

FIG.1.

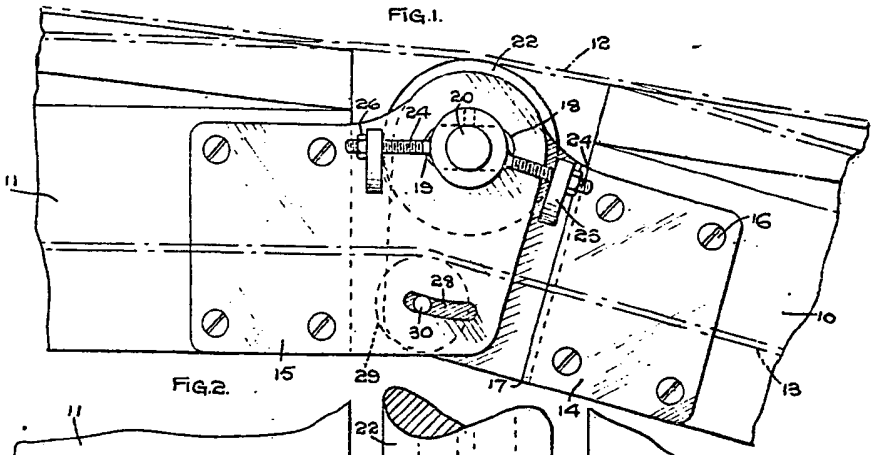
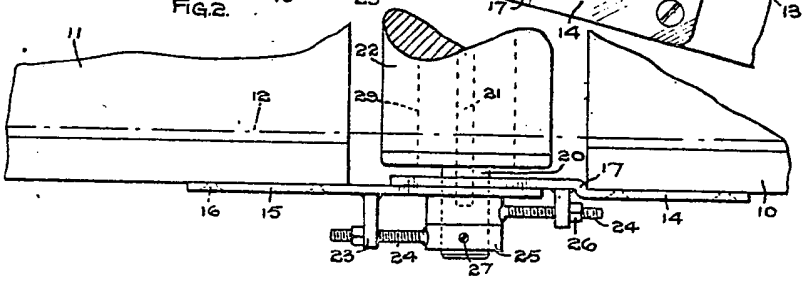


FIG.2.



H.M.S.O. (Ty. P.)